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Trinuclear cage-like Zn^{II} macrocyclic complexes: enantiomeric recognition and gas adsorption properties.

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Three zinc(II) ions in combination with two units of enantiopure [3+3] triphenolic Schiff-base macrocycles**1**,**2**,**3**, or**4**form cage-like chiral complexes. The formation of these complexes is accompanied by the enantioselective self-recognition of chiral macrocyclic units. The X-ray crystal structures of these trinuclear complexes show hollow metal-organic molecules. In some crystal forms, these barrel-shaped complexes are arranged in a window-to-window fashion, which results in the formation of 1D channels and a combination of both intrinsic and extrinsic porosity. The microporous nature of the $[Zn_3\mathbf{1}_2]$ complex is reflected in its N_2, Ar, H_2, and CO_2adsorption properties. The $N_2$and Ar adsorption isotherms show pressure-gating behavior, which is without precedent for any noncovalent porous material. A comparison of the structures of the $[Zn_3\mathbf{1}_2]$ and $[Zn_3\mathbf{3}_2]$ complexes with that of the free macrocycle $H_3\mathbf{1}$reveals a striking structural similarity. In $H_3\mathbf{1}$, two macrocyclic units are stitched together by hydrogen bonds to form a cage very similar to that formed by two macrocyclic units stitched together by Zn^{II}ions. This structural similarity is manifested also by the gas adsorption properties of the free $H_3\mathbf{1}$macrocycle. Recrystallization of $[Zn_3\mathbf{1}_2]$ in the presence of racemic 2-butanol resulted in the enantioselective binding of (*S*)-2-butanol inside the cage through the coordination to one of the Zn^{II}ions.

Słowa kluczowe

cage compounds, macrocycles, microporousmaterials, self-recognition, zinc

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